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(57) Abstract

Method and system for patient-oriented optimization of orders of care treatments offered by a care provider as well as a patient identification card for use in this method and in this system, comprising: the reading of an access code by a computer programme loaded into a computer, said access code being incorporated into a module of indelible data on a patient identification card; the generating of an output signal following the positive identification of the access code by the computer programme; the reading of modules of variable data on the patient identification card by the computer programme by means of the output signal; the processing of central data files filed in the main memory of the computer by the computer programme, said files concerning the care activities and/or the patient, and processing the data read on the patient identification card in such a manner that an order of care treatments is generated which is optimally patient-oriented, and the updating of the variable data on the patient identification card and updating the central data files after the care treatment.

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METHOD AND SYSTEM FOR PATIENT-ORIENTED OPTIMIZATION OF
ORDER OF CARE TREATMENTS AND PATIENT IDENTIFICATION CARD
FOR USE IN SUCH A METHOD OR SUCH A SYSTEM.

The invention relates to a method for patient-oriented optimization of an order of care treatments offered by care provider, wherein the degree of utilization of all means at the disposal of the care provider, which together
5 with many afore-mentioned orders of care treatments constitute, in their mutual dependence, the care process, is maximized.

The invention further relates to a system for patient-oriented optimization of an order of care treatments
10 offered by care provider, wherein the degree of utilization of all means at the disposal of the care provider, which together with many afore-mentioned orders of care treatments constitute, in their mutual dependence, the
15 care process, is maximized.

The invention relates furthermore to a patient identification card for use in such a method and in such a
20 system.

Within the scope of this application, the term 'patient' covers all of the following terms: patient, client, user, consumer, resident and insured person in as far as applied within the social service sector. The term 'care provider'
25 includes all providers of care such as general practitioners, pharmacists, specialists, nurses, paramedics, institutions providing care and the like.

Within the social service sector there is a significant

waste of means on the one hand, while on the other there are no or insufficient means available for urgent matters. Both waste and shortages threaten the attainable level of quality of the processes of primary care. Years of experience, analyses and many experiments have made it clear that the following causal factors especially lie at the basis of the present situation:

- many care providers are involved in providing care to the patient, each care provider organising severally a part of the care process concerning the patient.
- the patient is not made to become actively involved in planning his own care process.
- the management hardly have any relevant basic information at their disposal concerning the primary processes.
- quality of care as a concept has not been put into practice.
- as a consequence of lack of coherence, every person involved generates (being more or less forced to do so) an enormous bureaucracy. Consequently, the number of staff that could be employed in primary processes is restricted by about 20%. This bears hard on the patient (waiting lists, damage to the care provided) and on society as a whole (social waste).
- motivation among people and organisations concerned (local governments, insurance companies, providers) to become more patient-oriented is low through lack of perspective, since the sphere of influence is so delicately balanced that an action by one party is viewed with distrust by the other parties.

An important problem in the social service sector is that the patient is not actively involved in the planning of his own order of care treatments. It is a trend within the social service sector, to make the patient more actively involved in this.

The way in which this is done anticipates an expected future strengthening of the legal position of the patient

as regards the medical treatments he is receiving. In liability regulations these medical actions are usually seen as agreements of exertion between patient and care providers. In view of the increase in (often painful and energy-consuming) legal procedures as a consequence of actions which are alleged to have been performed incorrectly or medical treatments which have not been carried out to the satisfaction of the patient, there is an ever stronger call in society for a treatment agreement between patient and care provider. In the Netherlands, this desire finds its expression in a proposal for a new Act concerning the medical treatment agreement.

Apart from this, a patient will be treated several times for different disorders by different providers of care. In their files, these care providers have files containing data about the illness of the patient, treatments etc. This results in the existence of many medical files per patient, scattered over several files of care providers. In The Netherlands alone, there are on average 14 medical files per inhabitant, that means about 200 million files in all. This situation entails a great deal of (already difficult) communication, many unnecessary actions, much unnecessary bureaucracy, but above all it means that the quality of overall care and the contribution of each individual action is very difficult to measure. When a patient wants to have access to his own historical medical data, he will usually need permission to inspect these files from different providers of care, if these can still be traced. But also in the case in which a care provider wishes to know something about a certain detail of a medical nature having to do with an illness of his patient in the past, this can be difficult to trace or only to be obtained from many other care providers. Hereby, a great deal of time is lost, which can have serious effects for the patient.

An often recurring problem in health services is the delays for the patient. After an examination at the clinic or the pronouncement of a diagnosis by a doctor, an indefinite period of time may go by before the patient receives information as to the time and place at which a subsequent examination or an operation will take place. If a patient has to undergo several interdependent medical treatments, the dependent care activities are only planned after the care activities on which they depend have been performed. This type of planning mechanism causes an accumulation of waiting periods for the patient. As a consequence thereof, the patient will be in a state of uncertainty during a certain period, his private and business life becoming subordinated to the planning procedure of the care provider concerned. These 'costs' have never been defined as health care costs but they run into billions of guilders every year. What is meant here are costs which are shifted onto individuals or onto a group of people collectively, such as for instance the Sickness Benefit System or the Disablement Insurance Act/ General Disablement Act. It would therefore be beneficial to the patient to make this period last as short as possible. Apart from this, it would be advantageous to him if the period between the first and the last care treatment is fixed as early as possible.

The care provider too, benefits from fixing periods of different treatments of a patient at as early a date as possible, since it will then be possible to make an early assessment of the equipment which will be required for these care treatments. Such requirements are, for instance, certain care providers for a care treatment, the location at which a care treatment will take place, the aids and drugs needed for the care treatment. When such data are known for all future patients, the available means can be used to their fullest extent.

In a first aspect, the invention is characterized by a

method and a system which optimizes the stream of patients of a care provider consisting of a multitude of an order of care treatments to be carried out per patient, by rendering these treatments interdependent by means of the permission given by the patient to carry out these care treatments, wherein said optimization consists of a minimization of length of time between first and last care treatment of an order of care treatments and a maximazation of the degree of utilization of the means at the disposal of the care provider, consisting of care workers, aids, equipment, space and stocks of goods and drugs.

In a second aspect, the invention is characterized by a method and a system which collects and manages data concerning the state of health of the patient, wherein all these date are the property of the patient and relate to care treatments, irrespective of the fact, that these have been carried out or are being carried out by different care providers, and the patient possesses an information carrier with a unique combination of personal data which provides him sole access to the date concerning his state of health which are present in the system.

In the third aspect, the invention is characterized by a method and a system which contains the means offered by the care provider and the care treatments offered by the care providers and which can express these in units of time, costs or price per units of time, weight or volume, wherein the system determines the costs, price and duration of a future order of care treatments, after the patient has given permission for them to be carried out.

In a fourth aspect, the invention is characterized by a patient identification card, owned by every resident of a country in which the care provider concerned is situated, said card functioning as a key, by means of which permission is granted for care treatment or order of care treat-

ments on the owner and which provides the owner with sole access to an integral survey of his personal medical data. The card also functions as key to the system which contains a combination of personal data which is unique for that person, so that it is of no use and/or value to people other than himself.

In a fifth aspect, the invention is characterized by a computer programme which has, using hardware equipment suitable for this purpose, sole access to the data contained on the patient identification card.

The sixth aspect of the invention is characterized in that the system is continuously generating developing criteria which render the quality of care measurable and assessable, so that it will be possible, in some cases, to immediately compensate injured parties without having to look at the question of guilt, by which not only the patient is spared additional suffering, but by which the providers of care too, are given the opportunity to continuously adjust and improve their care programmes.

The seventh aspect is characterized by the built-in possibility of obtaining a payment guarantee beforehand by coupling permissions to packages of care for which the patient is insured.

The eighth aspect is characterized by the possibility of using the patient identification card as drug card, donor card or for the benefit of (alterable) expressions of a person's will in case of coma, incompetence, the matter of euthanasia, etc.

It is the object of the invention to raise the quality of care and to drive back waste within and increasing the availability of the care providers for the primary processes of the social service sector, and to make use to

measure of the means required, by which the drawbacks and problems mentioned previously are removed to a large extent. Waste is often confused with inefficiency. This is not correct. Especially in the social service sector, it happens that people are working very efficiently on use-
less tasks. Efficiency requires well-defined goals. Since these do not exist, (health)care efficiency is an empty phrase. The invention ensures that goals will have to be set per treatment of each individual case, so that the efficiency can be assessed as far as these goals are concerned. It will then be possible for similar cases in a different setting, to have a different efficiency. By deriving the secondary and tertiary processes from the primary processes, the efficiency of the former two can be determined.

More in particular, the invention concerns an automatized planning system, which determines the order of care activities to be provided by care providers for the benefit of the treatment of a patient in such a way, that the duration of the order of care activities is as short as possible and the quality of the care offered is as high as possible and that the means required for this are used as efficiently as possible, wherein this automatized planning system uses a unique means of identification which belongs to the patient, by means of which the patient authorizes the user of the automatized planning system to carry out care activities for the benefit of the patient. Because it is the care treatments, which are the same the world over in their systematics, which are taken as a starting point, the planning system can be used in any care system.

For this purpose, the invention provides a method of patient-oriented optimization of an order of care treatments offered by a care provider, comprising:

- the reading of an access code by a computer programme loaded into a computer, said access code being incor-

porated into a module of indelible data on a patient identification card,

- the generating of an output signal following the positive identification of the access code by the computer programme,
- the reading of modules of variable data on the patient identification card by the computer programme by means of the output signal,
- the processing of central data files filed in the main memory of the computer by the computer programme, said files concerning the care activities and/or the patient, and processing the data read on the patient identification card in such a manner, that an order of care treatments is generated which is optimally patient-oriented, and
- the up-dating of the variable data on the patient identification card and up-dating the central data files after the care treatment.

For this purpose, the present invention moreover provides a system for patient-oriented optimization of care treatments offered by a care provider, comprising a patient identification card having a module with indelible patient data and an access code and further modules with variable data, and a computer programme loaded into a computer to which the patient identification card has sole access by means of the access code, the computer programme having access, after the access code has been read by means of reading equipment, to the further modules and to central data files, said computer programme being suitable to optimize the care treatments.

The system for data management consists of a computer programme describing a care provider as a process flow chart and a collection of information-carrying patient identification cards, wherein the computer programme has sole access to the data stored on the patient identification card and the patient identification card has sole

access to the data stored in the files of the system concerning the state of health of the owner of this card.

The computer programme is stored in a main memory to which
5 personal computers are coupled by means of known techniques such as networks, said personal computers being located anywhere in the care institution where care treatments are performed. All personal computer are coupled in situ to equipment which is capable of reading information
10 from and filing it on the patient identification card. According to known techniques, this information can be in an optical, magnetic or electronic form, or a combination of these forms.

15 As a consequence of this, the way in which a patient passes through an order of care treatments can be optimized, because the way in which the patient passes through the primary process, is taken as a starting point. Because the secondary and tertiary processes are geared
20 thereto (by means of formulas of logistic management), the efficiency of the two latter processes is heightened even more. This starting point therefore concerns a patient-(client-oriented) orientation. For the social service sector this is a unique starting point, because providers
25 of care work in a production- and product-oriented manner. In that case, availability determines the order of care treatments. If there is any efficiency at present, this is organised in an unstructured manner within the secondary or tertiary processes. In that way, too, the manner in
30 which the secondary and tertiary processes are coupled following the primary processes, is unique.

By means of the invention it is possible, moreover, that the patient gives and records his permission for medical
35 treatments to be carried out by the care provider prior to these treatments. In this way, the agreement of exertion takes on the character of a result-oriented agreement,

because the care provider will for instance be forced, on the basis of the Act mentioned before, to explain to the patient what the treatment entails, what the risks are, what the consequences or possible results may be and
5 whether there are any alternatives available. By having this recorded systematically by both care provider and patient in one single document, it will be possible to measure if and to what extent the expectations have been realised and what the consequences thereof should be.

10

Apart from that, it will be possible for the patient to manage his entire file himself.

Quality and efficiency can therefore be significantly
15 increased if a central medical file is created, which is owned by the patient and to which the patient has complete access and to which the care provider to whom the patient has turned, has access for the relevant parts only. Since the files are the property of the patient, the latter can
20 himself give permission to third parties to use data from his file. One could think, for instance, of scientific institutes who might be able to use these specific data for research.

25 If a central system according to the invention is present in a care institution which contains all previously mentioned means of the care institution and their mutual dependence, then it will be possible to create, while optimizing the degree of utilization, a planning per
30 individual means. Such a system ensures that all means for a certain care treatment are present at the desired time and place, after a working schedule has been drawn up per individual means prior to the time at which the care treatment takes place. The result of this is that every
35 care provider connected to such a care institution will know what his planning for the day, week or month will be, thus making it possible to minimize unproductiveness

during his periods of presence at the institution.

With regard to aids, drugs and other goods that may be required, this might lead to planning of the flow of goods
5 and to stock management.

The system, which couples the means required for carrying out all individual care treatments to these treatments and which knows the cost price per means per unit of time,
10 will moreover be able to immediately determine the costs of a future order of care treatments during a certain period.

Of its own accord, the system generates as it were standards for a responsible type of care for similar patients
15 with similar problems and at the same time it indicates what should be understood by 'care on the basis of the state of the art of medical science' on a day to day basis.

20 This continuous developping of criteria makes it possible to couple a patient injury insurance to the system. This is not an insurance in the established sense of the word, but a provision which ensures that a care provider is
25 compensated without all sorts of procedures and without going into the question of guilt, if the care provided was of a poor quality: for after all, providing care is first of all the work of man. The system will then be able to immediately trace the source of the problem so that effective
30 measures can be taken immediately. Should the incident repeat itself, then culpable behaviour can be deemed to have been established, in which case the procedures which are now usual will have to be followed. It will be possible, however, to deal with these in a short
35 period of time, because all the facts are known directly and have been indisputably recorded.

The invention also provides a patient identification card provided with a carrier containing modules with indelible patient date and access code and further modules with a memory capacity for variable data, which is eminently
5 suitable for use in the method and the system according to the invention.

If the patient possesses an information-carrying card which serves as a means of identification for the system
10 and which provides sole access to his medical files stored in this system, it is essential that this card also contains some data of a personal nature which do not vary and which can be extremely relevant to certain care treatments. Examples of this are blood group, tissue typifica-
15 tion, certain allergic reactions and for the future one might think of fingerprints or DNA-code.

These characteristics will only need to be determined once, while nowadays it still happens more than once.
20

The card could also contain data of a personal data which could have far-reaching consequences for the treatment but which could change during a person's life. One might think here of a donor card, persons who are the patient's con-
25 fidants and who should be consulted in case of coma, expressions of a person's will (euthanasia), etc.

Because drugs used are also registered, it will be possible to have the information-carrying card serve as a so-
30 called 'drug card' as well, and even as a prescription. It need not be argued that many errors which occur at present and hospital admissions which are the consequence of these errors, might be avoided.

35 Another advantage could arise if the information-carrying identification card contained data concerning the insurance package of the patient and data as to whether or

not there are general or specific personal liabilities, so that the care provider, by obtaining the permission of the care provider to carry out a certain order of care treatments, will also have a guarantee that the care provider
5 will be paid for his exertions.

Cards and equipment which can be used for the purposes stated above are known in themselves. They could, for instance, be so-called smart cards, optical cards of
10 magnetic strip cards, or a combination of these, which can be read in and out by equipment which is for sale in the shops. Because some goods are provided with standardized barcodes, the reading equipment should be able to read barcodes as well. This equipment can be coupled to per-
15 sonal computers in a known way.

Some embodiments of the invention will be described by way of examples by means of the accompanying drawing, in which:

20 Figure 1 shows a structure of the computer programme to be used in the method and the system according to the invention,

Figures 2A en B, respectively, show the front and the back of a patient identification card, and

25 Figure 3 shows a schematic process chart of a care institution.

As represented in figure 1, the computer programme 3 uses central data files 2, containing information about the
30 means at the disposal of the care institution. All means are present in the form of variabels.

Examples of these means are:

- diagnostic codes
- therapeutic codes
- 35 - available locations for care treatments
- available equipment
- available goods

- available medical and care means
- available staff
- management

5 The variabels are rendered interdependent, in as far as
this applies in the care institution concerned, and/or
provided with specific preconditions (such as for instance
care workers who work specific hours and can therefore
generate different costs). All variables possess a code to
10 which a length of time and costs per unit and price per
unit are coupled. This interdependence leads to a collec-
tion of possible processes which together represents the
care package offered by the care institution in the shape
of a process flow which can be passed through by the
15 patient. An example of this is represented in tabel 1.

Each process starts with reading the patient iden-
tification card 5 (figure 2). This has a module 6 with the
following data in indelible form:

- 20 a. an identification number consisting of a main number
and a serial number which are composed as follows:
- for residents with a personal national insurance number
the main number is the national insurance number and the
serial number is zero.
 - 25 - for residents without a personal national insurance
number, the main number is the national insurance number
of the natural person or legal body which represents them
(for instance parent, guardian, curator, government insti-
tution) and the serial number is between 1 and 999999999
30 (children, inhabitants of special institutions).
 - . for non-residents, the main number is the national
insurance number of the domestic authority responsible for
him or an identification number of a foreign authority and
the serial number is between 1 and 999999999. This would
35 include, for instance, centres for persons seeking asylum,
foreign travel insurers or countries.

Each care provider is handed their own serial numbers for these cases. These numbers can also be used in those cases in which, for some reason, residents are (temporarily) not in possession of their card and in which immediate medical treatment is imperative: a so-called wild card.

b. the blood group of the patient, possibly complemented with other unvarying data such as tissue typification, finger print, DNA-code, allergies or specific disorders.

10

c. an access code consisting of, for instance, 10 digits.

After reading module 6, the computer programme 3 generates an output signal (i.e. the key/password) by which other modules, for instance 7, 8 and 9 of the patient identification card 5, become suitable to be read by the computer programme 3. The content of these modules 7, 8 and 9 can be altered by the patient and/or an authorized person.

20

These further modules 7, 8 and 9 could for instance contain the following data:

Donor code and other information connected with this as well as other expressions of a person's will, such as authorized persons, euthanasia, etc.

Data concerning the insurance package, such as the name of the insurance company, the policy number, the standard package, the presence of general and specific personal liability, supplementary packages, etc.

Data concerning facts and conclusions of care treatments that have already been received or have yet to be carried out as well as concerning medication (drug card).

Data concerning care treatment in home care situations by for instance general practitioners and paramedics.

Data intended for assessing quality and for the medical insurance of the patient.

Data intended for other purposes.

After the patient identification card has been read, the patient authorizes the carrying out of an order of care treatments relating to himself. The nature (of the treatment), in the form of a code or combination code, constitutes the input fed to the computer programme by a care provider or by variable modules of the patient identification card. The latter is the case if this information was already stored in these modules as a consequence of a previous programme output. Subsequently, the programme generates the following data 4 according to the schedule concerning the order of care treatments represented in figure 1:

- A. Locations where the care treatments will take place.
- 15 B. Starting times of the care treatments
- C. Estimated finishing times of the care treatments.
- D. The names of the care workers required for the care treatments.
- E. The required aids and goods.
- 20 F. The required medication.
- G. The required number of hours of each care worker per care treatment.
- H. The times at which each care worker should be in a certain place.
- 25 I. The costs of the number of hours per care worker.
- J. The costs of the aids per care treatment.
- K. The costs of the medication per care treatment.
- L. The costs of the equipment per care treatment.
- M. The costs of the location per care treatment.
- 30 N. The total costs of the order of care treatments.
- O. The price to be charged for the order of care treatments provided.
- P. Possible references for subsequent care treatments (medication, etc.).
- 35 Q. Possible follow-up appointments.
- R.

Z.

The nature of the order of care treatments is filed in the medical file of the patient in the file of the main memory
5 in codes or a combination of codes together with possible particulars or remarks made by a care provider. At the same time, A - F and O - Q are also filed in this file.

The patient receives a print-out of a part of the output
10 (A., B., C., O., P., Q.,) as well as of the nature of the order of care treatments, while this information is also stored on a module of his patient identification card.

Since the data under H. are stored in the files intended
15 for this purpose, a planning for each care provider will be available immediately. In practice, the care provider could receive a print-out of this information once a week, so that he will be in possession of his schedule before the working week starts. It will also be possible for him
20 to gain access to this file by means of a personal password, so that he can see what his schedule looks like at any given time.

Because the goods, equipment and drugs to be used (E., F.)
25 as well as the quantities thereof are filed in specific files (see figure 1) and because the system also knows what the minimum amounts per item should be (the so-called critical stock), the computer programme also generates the information as to at what time a specified amount of a
30 certain good, aid or drug should be ordered. In this case too, this can be followed up by a letter being sent to the person responsible for purchases, or the person can read this for himself in the files concerned by means of a password. In this manner, the system can manage the stocks and
35 supplies.

Due to the fact that the system retains all data concer-

ning care treatments, it is possible to use the system as an instrument for forming a judgement on the quality of care offered per care provider, per ward, per piece of equipment, per location, etc.

5

The patient has access at all times to his own medical file, so that he will not need permission for this from the care provider. The patient himself owns this file. The system reveals the codes stored on the patient identification card, so that the system as it were manages the file for the patient.

If the patient dies, it will be possible to learn from a module of the patient identification card, whether care treatment should be planned in relation to donorship.

Because another module can contain the insurance data, it will be possible to determine the costs of certain care treatments before they are carried out and also before reading the card for the benefit of planning. It will also be possible to determine how much of the costs will be paid by the insurance company and how much the patient will have to pay himself. These data could lead to a preference for different care activities, thus enlarging the range of options for the patient.

After permission has been given and the data have been stored, the price of the care offered can immediately be stored on this module or, if desired, on paper. Payment can then take place immediately after the last care treatment by the patient or his insurance company. At present, payment does not take place until at least 60 days after the last treatment.

Although the shape and quality of the patient identification card is such that it can easily be carried around by its owner, there will be patient identification cards

of the wild card type for non-residents in each institution and in each mobile care unit.

The process chart of the optimization programme to be used in the method and in the system according to the invention, will be described by means of figure 3.

A number of days before the patient is admitted, the main coordinating department will have at its disposal all the capacity still available. Then, it will have to be determined how much capacity will be available on the day of admission, taking into account appointments that have been made and expected urgency. A selection will also be made of those patients who are available on that admission day. This selection will also include patients who are on the waiting list. Moreover, it will already be known which patients have indicated that they will be available, should they be admitted earlier. This last group is selected on the basis of criteria of the medical specialist. Now, both the availability of capacity and the demand for this capacity are at the disposal of the people concerned.

Mathematically formulated one is faced, when drafting an admission programme in which these two elements of supply and demand are combined, with a problem with a linear goal function, non-linear preconditions and binary variables. The admission programme will have to meet the following requirements:

- sufficient capacity for patients urgently requiring care,
- patients requiring semi-urgent care have to be admitted within the time set,
- remain with the preconditions of the capacity,
- the longer on the waiting list, how higher the priority (semi-urgent typification),
- patients should not be forgotten (especially the internal transfers who are often less urgents, but who should not

be dismissed between treatments,

- capacity bottle-necks should be used to the best possible advantage.

5 The programma works as follows:

1. sort the list containing available patients on the basis of priority. (this leads to sorted list 10)

10 The patients having the highest priority are these requiring semi-urgent care. Within this group, a further selection can be made on the basis of the length of time a patient has been on a waiting list. It will also be possible to sort the remaining patients per specialty on the basis of the length of time that they have been on the waiting list.

15 2. Fill up the time available in the operating theatre and the available beds per specialism with patients appearing on the sorted list in order of priority.

20 In doing this, attention should be paid to the difference between beds in male and female wards. The following situations can arise:

- the beds available are filled, but there is still time available in the operating theatre (11 yes)

- the time available in the operating theatre is filled up but there are still beds available (11 no)

25 In the first case, a smaller operation will be replaced by a bigger operation (12). This can be done in the following way: the operations can be divided into three groups on the basis of duration, operations of a short, medium or long duration. Out of the sorted list of patients, the
30 patient with the lowest priority who is to undergo a small operation is selected. This patient is replaced by the patient who has not yet been selected, who has to undergo a long operation and who has the highest priority. In the second case, no action takes place at yet.

35 3. -allocating the selected patients to the wards.

First of all those patients are placed who can only be helped by one ward (13). The remaining patients are sorted

on the basis of the workload they generate, in decreasing order. For every ward where beds are still available, the remaining available workload (15) is calculated as indicator. Patients who already have an appointment for the admission day concerned, can also be included in this placement procedure (16), but care should be taken to ensure that they are admitted in any case.

4. Solution in case of workload problems (18) when all patients have been placed (17).

10 When the agreed limits are exceeded, serious patients will have to be replaced by patients requiring less care (19), or one should see where there is any capacity left. If, apart from workload, a bed is available, too, a reshuffle may suffice. If not, a patient requiring a great deal of care will have to be deleted from the list of admissions (20). Time in the operating theatre which thus becomes available (21) can be used by a patient who puts less of a strain on the workload. Apart from that, all sorts of combinations can of course be considered.

20 5. filling up remaining capacity (23).

If there are wards who have both beds and nursing capacity available, these can be used by admitting patients who do not have to undergo surgery. It will also be possible to replace a lengthy operation by two shorter operations. Selecting a certain option will depend on the relative priority of the patients.

The heuristics described above are applied in hospitals where the available time in the operating theatre is considered to be a bottle-neck. This time is namely filled in first. Then, the capacity of beds is looked at, and last of all the nursing capacity. The latter is by no means the least important. However, practice has shown that the nursing capacity provides most opportunities for shifting. In this way, the programme results in an optimal use of the available time in the operating theatre within the preconditions set.

In a practical example the application of the inventive method and the inventive system can generate the following data for the person concerned:

5 The patient.

A patient visiting the clinical consulting-hour receives the following letter at the end of the consultation, with the following contents:

- 10 1. Dear Sir/Madam, date and diagnosis
2. Date of admission, time of admission, ward room,
3. Day of operation, time of operation, surgeon,
4. Day of discharge and time of discharge
5. Persons responsible for treatment, care and service
- 15 6. telephone number of the admissions department in case of eventualities
7. Visiting hours
8. Complaints procedure and kind regards from the management.

20

The surgeon

On a weekly, and if necessary on a daily basis, the surgeon receives a survey from the admissions department, containing the following information:

- 25 1. Dear Dr. Z.,
2. survey of the number of patients to be admitted per day, operation/diagnosis, ward, room number
- 3, survey of the number of patients to be operated on per
- 30 day, operation/diagnosis, ward, operating theatre no.
4. starting and finishing times per operation,
5. additional operation facility,
6. the waiting list (planned, not planned),
7. visiting hours and a survey of consulting hours,
- 35 8. extra consulting hour facility,
9. the number of patients for whom discharge has to be arranged per day, per ward, room number.

The anaesthetist

1. Dear Dr. v.d. H.
2. a survey of the number of patients to be admitted per
5 day, operation/ diagnosis, ward
3. a survey of the number of patients to be operated on
per day, operation/diagnosis, ward, room number and opera-
tion theatre no.
4. starting and finishing times per operation for the
10 benefit of the anaesthetic procedure and waking time,
5. additional operation facility for for instance Dr. Z.

The main sterilisation department

- 15 1. Dear Mr. R
2. a survey of the number of surgery kits to be delivered
for operating theatres 1 - 25, per day, per operating
theatre

20 The medical specialist who does not perform operations

1. Dear Dr. V.
2. a survey of the number of patients to be admitted per
day, admission diagnosis, ward, room number,
- 25 3. a survey of the number of medical examinations to be
carried out per day, at the laboratory, the radio diagnos-
tics and the function departments,
- 4, the starting and finishing times per activity,
5. additional activities facility,
- 30 6. the waiting list (planned, not planned)
7. the visiting hours and a survey of consulting hours,
8. additional consulting hours facility.

The management of the operating theatres

- 35 1. Dear Mr. de J.,
2. summary of the number of patients to be operated on per
day, operation/ diagnosis, ward, room number, no. of

operating theatre, surgery kit,

3. the starting and finishing times of the operations
4. additional surgery facilities for, for instance, Dr. Z.
5. staff required per shift.

5

The management of the nursing ward for patients who have undergone surgery

1. Dear Mrs. K. (team leader)

- 10 2. survey of the number of patients to be admitted per day, operation/diagnosis, ward, room number, time at which patients are expected,
3. a survey of the number of patients to be operated on per day, operation/diagnosis, ward, operating theatre,
- 15 4. the times at which the patients should be delivered and collected.
5. additional operation facility,
6. the waiting list (planned/ not planned),
7. the visiting hours of the consulting doctors and a
- 20 survey of consulting hours,
8. availability of the specialists,
9. the number of patients for whom discharged has to be arranged per day, per ward, per room number.
10. required means (staff, aids).

25

The management of the nursing ward for patients who have not undergone surgery

1. Dear Mrs. J. (team leader),

- 30 2. a survey of the number of patients to be admitted per day, admission diagnosis, ward, room number, time,
3. a survey of the number of examinations to be carried out per patient, per day.
4. the starting and finishing times of the activity (time
- 35 of delivery and collection),
5. additional activity facility,
6. the waiting list (planned and not planned).

25

7. the visiting hours and a survey of consulting hours,
8. availability of the specialists,
9. the number of patients for whom discharge has to be arranged per day, per ward, per room number,
- 5 10. required means (staff, aids).

The management of the activity department

1. Dear Mrs. S (radio diagnostics, function examination,
10 physiotherapy, etc)
2. a survey of the number of examinations to be carried out per patient, per day,
3. the starting and finishing times per activity,
4. availability of the specialists,
- 15 5. required means (staff, aids)

Hospital bed service

1. Dear Mr. L.
- 20 2. survey of the beds becoming available per ward per day per room number,
3. possible remarks (infectious patient, etc),

Patient transport

25

1. Dear Mrs. V.
2. survey of the number of patient transports to and from the operating theatres with time schedule,
3. staff and possible other means required.

30

The referring party

1. Dear vv.
2. survey of number of patients, day of discharge, dis-
35 charge diagnoses, required follow-up care and possible complications that may arise,
3. availability of doctor in attendance,

4. follow-up appointments,
5. thanking you for the confidence you have placed in us, the management.

5 Domiciliary care.

1. Dear Mrs. H.
2. survey of the number of patients, day of discharge, discharge diagnoses, type of follow-up care required,
- 10 medication and possible complications that may arise,
3. availability of (specialized) nurse responsible,
4. follow-up appointments
5. Yours sincerely, the management.

15 (optional) The insurance company

1. Dear insurance company HZK, on the basis of our agreement
2. survey of number of patients insured with the insurance
- 20 company, days of admission, admission diagnoses, activities, nursing days, (possible) complication, discharge diagnoses and follow-up appointments
3. availability of care providers responsible
4. on the basis of the insurance packages, the general and
- 25 specific personal liabilities and on the basis of the agreement between yourself and the care providers, we charge you for the following amount.
5. availability of the financial administration
6. The following registered general payment conditions
- 30 apply to care provided by our institution.
7. We look forward to receiving your payment within 8 days on Girobank no. or on account no. of the HP Bank.
8. Yours sincerely, the management.

35 (optional) The municipal autopsist

1. Dear Mr. Z.

2. death by unnatural causes of patient M., admission date, admission diagnosis, activities, medication, complications, special circumstances, etc.

3. availability of the care provider or managing director
5 responsible.

4. time of the autopsy

5. Yours sincerely, the management/ care provider responsible.

10 (optional) The researcher

1. Dear Mr. O in L. in answer to your request ...

2. on the basis of our privacy regulations, we regret that we are unable to answer the following questions.

15 3. we can, however, answer the following questions, for instance: of the 80 patients with admission diagnosis X in 1996, 6 patients turned out to have a different discharge diagnosis.

4. In accordance with our agreement, we charge you for the
20 following amount for services rendered.

5. payment conditions, account numbers

6. Yours sincerely, the management.

(optional) The Public Health Inspector

25

1. Dear Dr. S in L.

2. Reporting error, accident, near accident, day of report

3. data patient, admission date, admission diagnosis, activities, operations, complications.

30 4. description of the error, consequences for the patient, possible cause,

5. care workers involved in the incident

6. availability of care provider and managing director responsible.

35 7. Yours sincerely, the management.

(optional) The patient with patient injury insurance

1. Dear patient P. in N.
2. Admission data and course of events
3. We feel that such a discrepancy has been established that compensation is called for,
- 5 4. we have traced the possible cause and taken measures to avoid repetition,
5. we sent a copy of this letter to the department of the patient injury insurance company responsible for carrying out the compensation procedure.

10

The system is very user-friendly because it minimizes many activities which are at present a constant source of irritation to the staff. These effects are aimed at motivating the staff to switch over from a product/production oriented style of work to a market/client-oriented style.

15 Time will become available for staff to concentrate on the essentials of their work. The amount of time gained comes from drastically reducing administrative procedures, reducing the number of useless actions and reducing the understaffing of the staff (and patient). The invention

20 has the following effects on the following groups of people concerned:

The nursing wards

25

The all or nothing effect (one of the main causes of the high level of sick leaves and disablement) is eliminated by:

- 30 - the number of patients to be admitted for pre and post operative care and non-surgical care will always fit within the hour profiles agreed upon.
- a shortage of shifts is regulated by a revised hour profile.
- a surplus of shifts can be used to raise the hour profile.
- 35 - the entitlement to the number of days off in a calendar year is regulated by the admissions depart-

ment.

- the time-consuming activity of looking for files is a thing of the past. The file will always be where the patient is.

5

The medical activities departments.

- the number of patients to be admitted for pre and post surgical care and non-surgical care will always fit within the hour profiles agreed upon.
- 10 - a shortage of shifts is regulated by a revised hour profile.
- a surplus of shifts can be used to raise the hour profile.
- the entitlement to the number of days off in a calendar year is regulated by the admissions department.
- 15 - the patient will always take his medical file with him. In this file, it will be automatically recorded that the medical activity has taken place.

20

The specialist

- optimizes his dedication for the benefit of the patients.
- 25 - experiences a drastic lessening of the burden of administrative procedures.
- will be more service-oriented towards his patients because it will be possible to immediately make suggestions for a programme of action and to record such a programme.
- 30 - will be in possession of the medical files prior to his consulting hour so they will no longer have to be traced.
- will receive a quality judgement after each sequence of care treatments, so that he will be better able to inform the patient beforehand
- 35 - it will be possible to get rid of 'soft' waiting

lists. Therefore more service for the patient.

- it will be easier to get rid of 'hard' waiting lists because it will be possible to use additional facilities which become available because other specialists temporarily have less patients
- applications for more means, if necessary, will now be automatically supported quantitatively.
- less negative energy needs to go into supposed favouratism because it is not a person but an 'objective' programme which is carrying out the optimization process.
- optimizing heightens the chance of a higher fee per time unit.
- immediate insight into costs and yields per patient or group of patients, so that one will be better able to choose between competitive examinations.

The management.

- The management will now be able to feed production agreements such as nursing days, admissions, medical activities, operations, visits to the clinic etc. into the programme, which production agreements can now indeed be realised by means of planning.
- the management will receive concrete and manageable information concerning costs and yields per operation/diagnosis and concerning products and statistical data on all possible variables.
- the data will enable the management to pursue a strategic management style, which is necessary in a health care sector which is being subjected to more market forces.
- the management will possess the necessary information to be able to realise a policy plan in a com-

petitive market by conducting well-directed negotiations with care insurers.

Although the invention is described above by means of the
5 medical sector, it will be obvious that the invention can
also be successfully applied in other social sectors.

In relation to the patient identification card, it is
observed that the access of the card to the computer
10 programma can not only take place via an access code
represented in digits, for instance magnetic, optical or
bar code digits, but that this can be done in many different ways.

15 It is possible for the card to have an access code in the
form of a coating which only reflects light in a certain
colour, in the form of a coating which becomes transparent
in a certain electro-magnetic field, in the form of a
surface of the card having a certain roughness, in the
20 form of a certain form of outline of the card or for
instance in the form of cut-away sections in the card.

SM

C L A I M S

1. Method for patient-oriented optimization of orders of care treatments offered by a care provider, comprising:
 - the reading of an access code by a computer programme loaded into a computer, said access code being incorporated into a module of indelible data on a patient identification card,
 - the generating of an output signal following the positive identification of the access code of the patient identification card by the computer programme,
 - 10 - the reading by the computer programme of variable data which have been rendered accesible hereby on the relevant modules of the patient identification card,
 - the processing of central data files filed in the main memory of the computer by the computer programme, said
 - 15 files concerning the care activities and/or the patient, and processing the data read on the patient identification card in such a manner that an order of care treatments is generated which is optimally patient-oriented, and
 - the up-dating of the variable data on the patient identification card and up-dating the central data files after
 - 20 the care treatment.
2. Method according to claim 1, characterized in that
 - 25 generating an optimal patient-oriented order of care treatment takes place in such a way, that the patient is placed on a waiting list of patients, that the computer programme sorts the waiting list in order of priority on the basis of patient data, and that, on the basis of the patient data and the central data files, it renders the
 - 30 care treatments mutually dependent to such a degree that

the length of time between the first and the last care treatment of the patient is minimized and the degree of utilization of all means at the disposal of the care provider are maximized in their mutual dependance as
5 defined by the computer programme.

3. Method according to any one of the preceding claims by which data concerning the state of health of the patient and the care treatments he is receiving are collected and
10 managed, wherein these data are the property of the patient and are accessible to the patient alone in a certain place by means of his patient identification card, regardless of the fact that these data originate from different care providers or various social workers.

15

4. Method according to claim 1 or 2, wherein the patient authorizes the carrying out of an order of care treatments for himself by means of his patient identification card.

20 5. Method according to claim 1 or 2, wherein the sum total of the means and care treatments provided by the care provider is expressed in standard units of money, time, people and volume in such a way that a future order of care treatments for a patient will, after the patient has
25 authorized it, determine the costs/price and duration of this order of care treatments.

6. Method according to claim 1 or 2, wherein measurable criteria are generated to ensure that injured parties can
30 be compensated regardless of the question of guilt, and whereby the order of care treatments and the means can be geared to each other more efficiently.

7. Method according to claim 4, wherein the patient identification card contains the care package for which the
35 patient is insured, by which, through authorizing a future order of care treatments, a payment guarantee is given.

8. Method according to claim 1, wherein the patient identification card contains erasable data for the benefit of a drug card, donor card, the expression of the patient's will concerning euthanasia, incompetence, etc.

5

9. System for patient-oriented optimization of orders of care treatments offered by a care provider to patients, wherein the degree of utilization of all means at the disposal of the care provider, which together with these
10 order of care treatments constitute, in their mutual dependence, the care process, is maximized, comprising a patient identification card having a module with indelible patient data and an access code and further modules with
15 variable data, and a computer programme loaded into a computer to which the patient identification card has access by means of the access code, the computer programme having access, after the access code has been read by means of reading equipment, to the data filed on earlier modules and to central data files determined by this
20 access code.

10. System according to claim 9 which collects and manages data concerning the state of health of the patient and care treatments he is receiving, wherein these data are
25 the property of the patient and to which he alone has access by means of his patient identification card, regardless of the fact that these data originate from different care providers or several social workers.

30 11. System according to claim 4, wherein the patient authorizes the carrying out of an order of care treatments for himself by means of his patient identification card.

12. System according to claim 5, wherein the sum total of
35 means and care treatments provided by the care provider is expressed in standard units of money, time, people and volume in such a way, that a future order of care treat-

ments for a patient will, after the patient has authorized it, determine the costs/price and duration of this order of care treatments.

- 5 13. System according to claim 6, wherein measurable criteria are generated to ensure that injured parties can be compensated regardless of the question of guilt, and by which the order of care treatments and the means can be geared to one another more efficiently.
- 10 14. System according to claim 7 and claim 11, wherein the patient identification card contains the care package for which the patient is insured, by which, through authorizing a future order of care treatments, a payment guarantee
- 15 is given.
15. System according to claim 8, wherein the patient identification card contains erasable data for the benefit of a drug card, donor card, the expressions of the patient's will concerning euthanasia, incompetence etc.
- 20 16. Patient identification card for use in a method according to claim 1 or 2, or for use in a system according to claim 9, characterized in that the patient identification card is provided with a carrier containing a module with
- 25 indelible patient data and access code and further modules having a memory capacity for variable data.
17. Patient identification card according to claim 16, wherein the indelible data consist of:
- 30 a. An identification number consisting of a main number and a serial number which are composed as follows:
- for residents with a personal national insurance number, the main number is the national insurance number and the
 - 35 serial number is zero.
 - for residents without a personal national insurance number, the main number is the national insurance number

of the natural person or legal body which represents them (for instance parent, guardian, curator, government institution) and the serial number is between 1 and 999999999 (children, inhabitants of special institutions).

- 5 - for non-residents, the main number is the national insurance number of the domestic authority responsible for them or an identification number of a foreign authority and the serial number is between 1 and 999999999. This would include, for instance, centres for persons seeking asylum, foreign travel insurers or countries.

Each care provider is handed their own serial numbers for these cases. These number can also be used in those cases in which, for some reason, residents are (temporarily) not in possession of their card and in which immediate medical treatment is imperative: a so-called wild-card.

b. the blood-group of the patient, possibly complemented with other unvarying data such as tissue typification, finger print, DNA-code, allergies or specific disorders.

c. an access code consisting of, for instance, 10 digits.

20

18. Patient identification card according to claim 16, wherein the access code consists of, for instance, 10 digits.

- 25 19. Patient identification card according to claim 16, wherein the further modules contain erasable data of the patient, such as:

Donor card and information connected with this and other expressions of a person's will, such as authorized persons, euthanasia, etc.

30

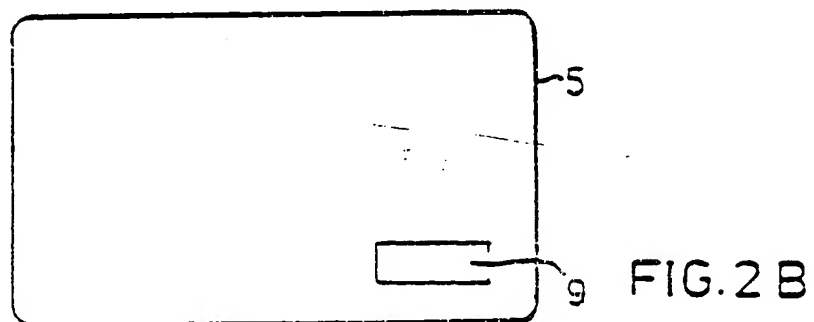
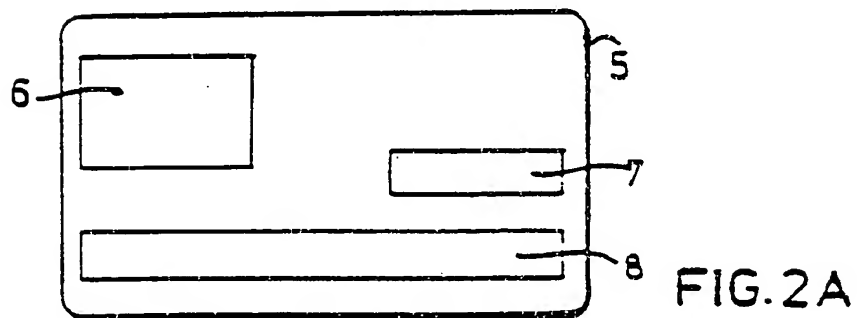
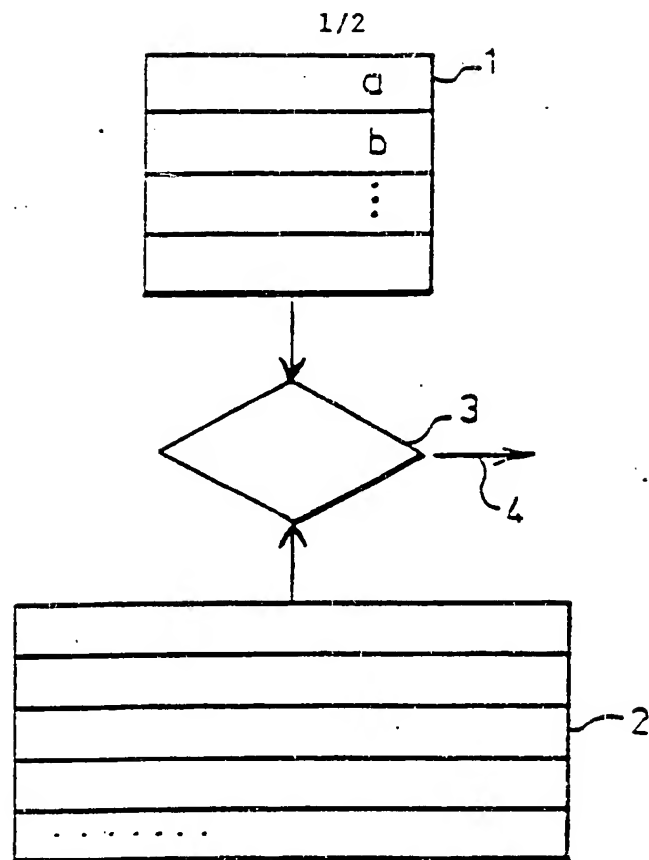
Data concerning the insurance package, such as the name of the insurance company, the policy number, the standard package, the presence of general and specific personal risks, supplementary packages, etc.

- 35 Data concerning facts and conclusions of care treatments that have already been received or have yet to be carried out as well as concerning medication (drug card).

Data concerning care treatments in home care situations by
for instance general practitioners and paramedics.

Data intended for assessing quality and for the medical
insurance of the patient.

- 5 Data intended for other purposes.



2 / 2

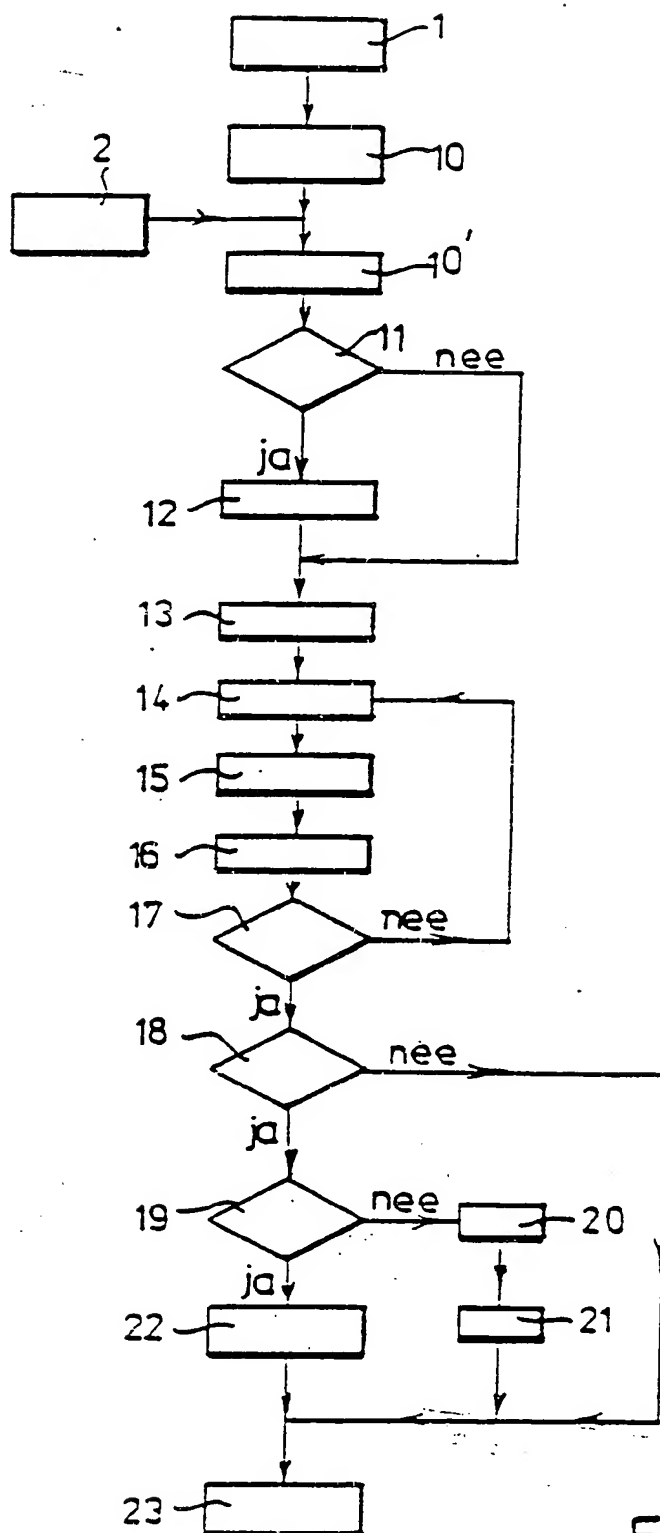


FIG. 3

SUBSTITUTE SHEET

INTERNATIONAL SEARCH REPORT

International Application No

PCT/NL 93/00092

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ⁵		
According to International Patent Classification (IPC) or to both National Classification and IPC Int.Cl. 5 G06F15/42		
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁷		
Classification System	Classification Symbols	
Int.Cl. 5	G06F ; G07F	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched ⁸		
III. DOCUMENTS CONSIDERED TO BE RELEVANT⁹		
Category ¹⁰	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³
Y A	WO,A,9 106 917 (A: GARCIA) 16 May 1991 see page 3, line 14 - page 15, line 27 ---	1,2,6,9, 10,13 3,12,14, 17,19
Y	FR,A,2 659 768 (SEXTANT AVIONIQUE SOCIÉTÉ ANONYME) 20 September 1991 see page 3, line 11 - page 5, line 34 --- -/--	1-7,9-14
<p>¹⁰ Special categories of cited documents :</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&" document member of the same patent family</p>		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search 24 AUGUST 1993		Date of Mailing of this International Search Report 01.09.93
International Searching Authority EUROPEAN PATENT OFFICE		Signature of Authorized Officer VOLMER W.

Form PCT/ISA/210 (second sheet) (January 1995)

III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)		
Category °	Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No.
Y	WO,A,9 115 817 (W.D. ALCOTT III, F.C. FINDLEY JR.) 17 October 1991	3-5,7, 11,12,14
A	see page 4, line 5 - page 13, line 5 see page 16, line 8 - page 26, line 13 see page 27, line 10 - page 33, line 2 see page 52, line 25 - page 53, line 12 see page 56, line 26 - page 58, line 27 see figures 1-36	1,2, 8-10,17
A	--- 3RD USA-JAPAN COMPUTER CONFERENCE PROCEEDINGS October 1978, SAN FRANCISCO, USA pages 441 - 446 A. WATANABE, R. IWAI: 'Small Business Computers in Medical Treatment and Management systems' see the whole document	1-5,7, 9-12, 14-16
A	--- FR,A,2 660 089 (M. CUPA ET AL.) 27 September 1991 see page 1, line 21 - page 4, line 31 see page 6, line 14 - page 7, line 30 see figure 1	1,8,9,16

**ANNEX TO THE INTERNATIONAL SEARCH REPORT
ON INTERNATIONAL PATENT APPLICATION NO.**

NL 9300092
SA 74418

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information. 24/08/93

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO-A-9106917	16-05-91	US-A- 5065315	12-11-91
		AU-A- 6622090	31-05-91
		CA-A- 2067747	25-04-91
		EP-A- 0497832	12-08-92
FR-A-2659768	20-09-91	None	
WO-A-9115817	17-10-91	AU-A- 7766691	30-10-91
		EP-A- 0525056	03-02-93
FR-A-2660089	27-09-91	None	

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82